

Barriers to Implementation for Digital I&C Upgrades

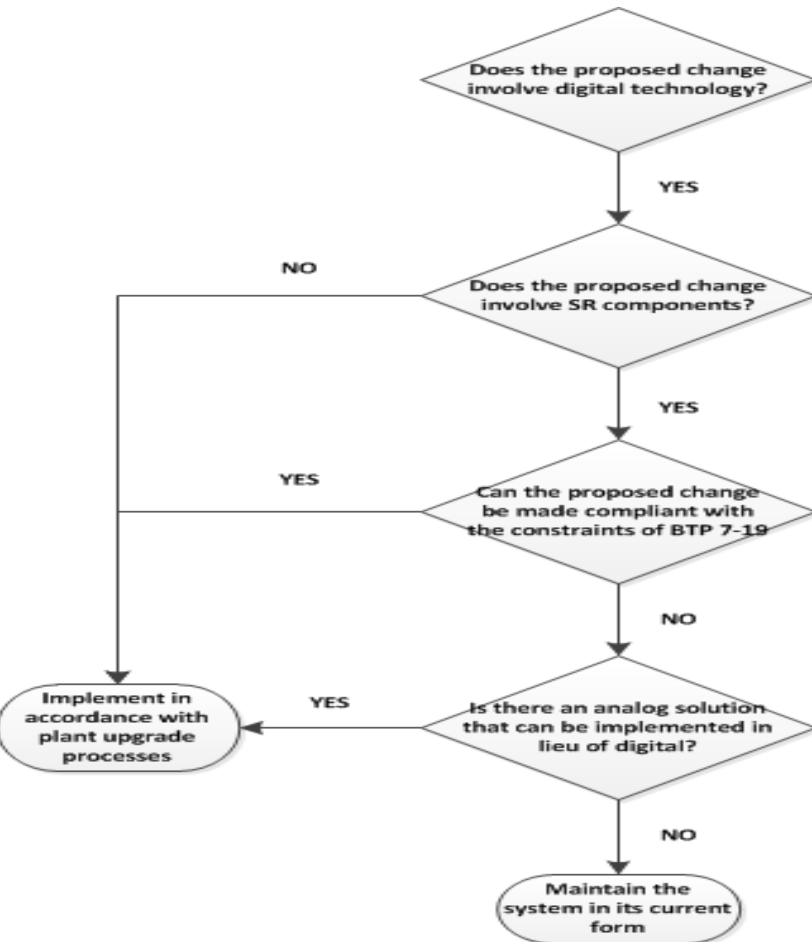
Public Meeting to Discuss the U.S. Nuclear Regulatory Commission
(NRC) Staff Effort to Re-Evaluate its Position and Guidance on Digital
Instrumentation and Controls Common Cause Failure

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Barriers to Implementation

- The next slide will discuss how the present Regulatory Framework (BTP 7-19) influences the decision making process when performing plant modifications that involve Digital I&C Upgrades

Barriers to Implementation – Digital Upgrade Process



The application of digital technology brings a variety of additional regulatory requirements into play.

It should also be noted that The definition of digital has expanded to include CPLD's, ASIC's and FPGA's.

The Scope of SRM 93-087 requires assessment of CCFs that impact safety functions. The RTS/ESFAS clarification was added in Rev. 4 of the BTP. The current BTP 7-19 expands the scope from "safety functions" to digital protection systems, auxiliary supporting features, and other auxiliary features.

- BTP 7-19 provides only two ways to preclude further consideration of CCF; internal diversity (sufficient diversity) or adequate simplicity that can be demonstrated through 100% testing. In the event that neither of those criteria can be satisfied, a coping analysis must be performed and there is no written guidance on how to perform this analysis for systems that do not perform a safety function credited in the safety analysis, or support systems. Furthermore it is unclear how a favorable coping analysis would be addressed in 50.59 (specially question 6) because it can be interpreted to produce a malfunction with a different result thus driving licensee to submit an LAR that is not warranted.
- In the absence of internal diversity or simplicity, CCF must be assumed.

If the digital solution is not "100% testable" or lacks "internal diversity" a licensee must assume that CCF vulnerabilities exist. This in turn drives the need to performing a D3 analysis in accordance with NUREG/CR-6303. Many of the acceptance criteria in BTP 7-19 are related to RTS/ESFAS and safety functions credited in the safety analysis. Digital upgrades to simple control systems do not align well with the BTP 7-19 framework.

In the event that a licensee reaches this point, a licensee would need to perform one or more of the following:

- License Amendment
- Perform a D3 analysis
- Enter the ISG-6 process

Entering these processes carries significant risk. Many projects that are envisioned for simple digital upgrades that are identified as "high-risk" during the plant change evaluation process will not move forward into the implementation stages.